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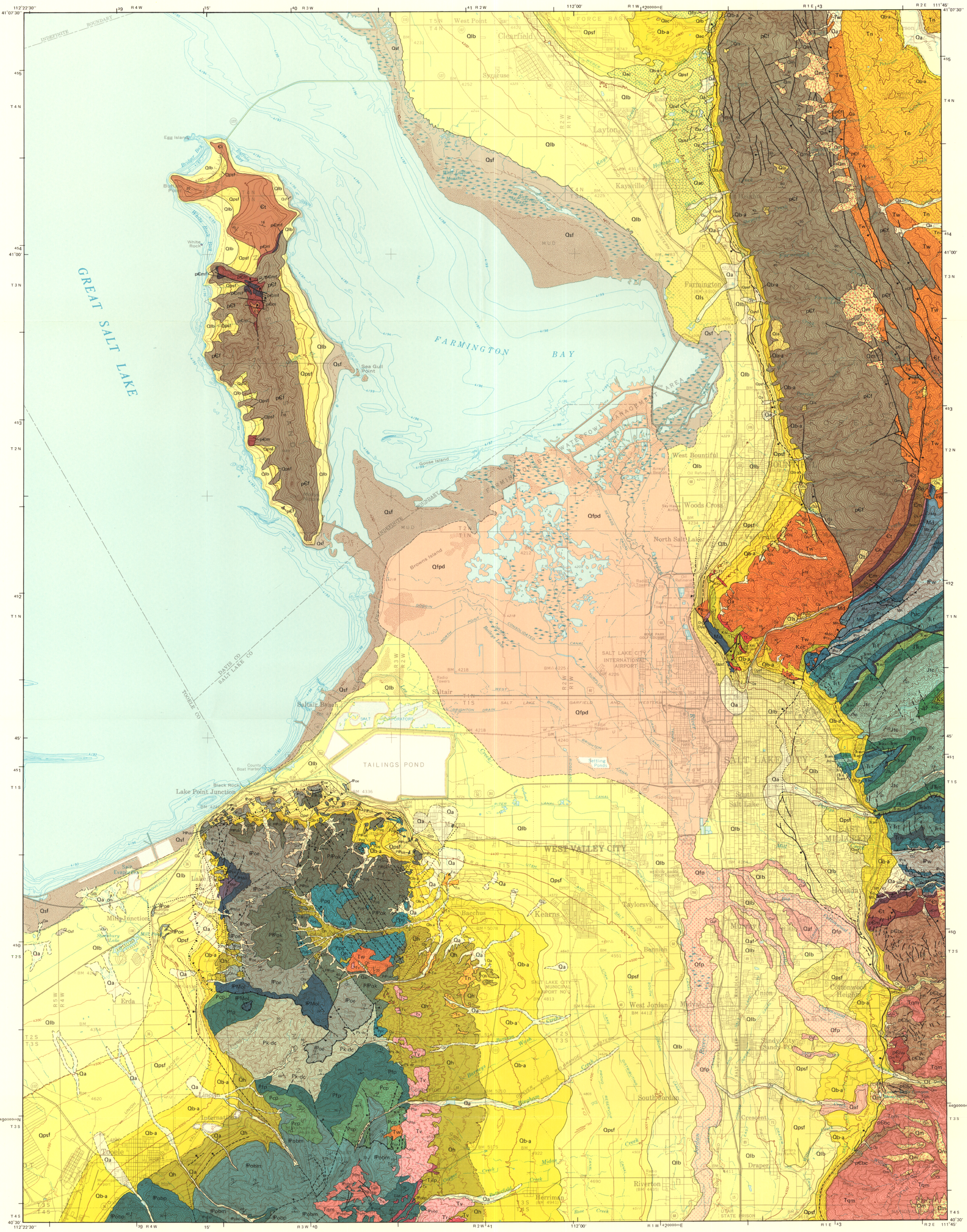
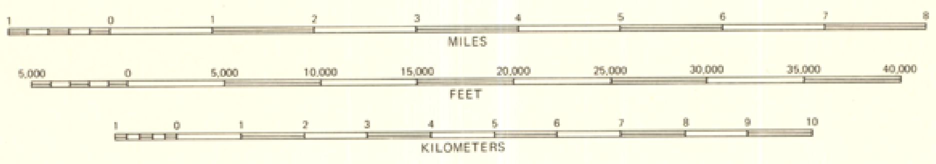


Base from U.S. Geological Survey
Great Salt Lake And Vicinity, 1:125,000, 1974

SCALE 1:100,000



Contour interval 100 feet
Underwater contour interval 1-foot
Datum mean sea level

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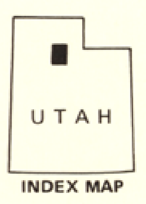
MAP 54-A

GEOLOGIC MAP OF THE CENTRAL WASATCH FRONT, UTAH

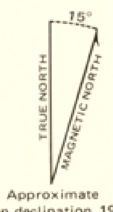
May 1983

Compiled by Fitzhugh D. Davis



INDEX MAP

Klaus D. Gurgel, Cartographic Editor
B.R. Jones, S.R. Stewart and D.E. Powers, Cartographers



Approximate
mean declination, 1981

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GEOLOGY OF THE CENTRAL WASATCH FRONT

Fitzhugh D. Davis[1]

INTRODUCTION

The accompanying map is one of a series that depicts various aspects of the physical environment along the Wasatch Front between Tremonton and Logan on the north and Santaquin on the south. This area is being rapidly urbanized and the impact of human activity on the natural environment has been (and will be) significant.

The geology of the Central Wasatch Front is very diverse and has rocks that represent nearly every geologic time period from Precambrian to Recent, including Tertiary intrusive and extrusive rocks. Only Ordovician and Silurian rocks are not present. Quaternary deposits (unconsolidated materials) have been divided into thirteen units and their delineation and composition should be of considerable interest and help to land use planners, engineers, and developers. Geologic structures found in the map area include: anticlines, synclines, normal faults, and thrust faults.

The map has been divided into six geologic and geographic areas to facilitate discussion. These are Antelope Island, Woods Cross to Clearfield, the Wasatch Mountains, Jordan Valley, the Oquirrh Mountains, and Tooele Valley. The geology of each of these is described briefly in the following paragraphs.

GEOLOGY AND GEOGRAPHY

Antelope Island

Antelope Island is a peninsula that juts northward into the Great Salt Lake from the southeast shore. A single sharp-crested ridge runs down the middle of the island with the highest point at an elevation of 6,596 feet (2,010 meters).

The bedrock of the island consists of the Precambrian Farmington Canyon Complex, Mineral Fork Tillite, and Mutual Formation. At the northern end of the island is a Cambrian formation, the Tintic Quartzite. These formations mainly consist of gneiss, tillite, and quartzite. The descriptions of these units and all units are given in the map explanation.

Lake Bonneville sediments and alluvial deposits surround the base of the island. They consist of shoreline (beach) deposits, stream channel deposits, and very fine-grained lake bottom deposits. (Lake Bonneville was a Late Pleistocene lake of which present Great Salt Lake is a remnant.)

The Bonneville sediments consist of the Lake Bonneville group which is divided into three formations: Alpine (oldest), Bonneville, and Provo (youngest). These sediments are unconsolidated, but locally may be loosely cemented by calcium carbonate. Numerous terraces of Lake Bonneville are notched into the flanks and spurs of the isle ridge.

The main structure of the island is an arcuate (convex to the east) trending anticline with steeply dipping limbs (**11, p. 93**)*.

Woods Cross to Clearfield

The area is bounded on the west side by the Great Salt Lake and on the east side by the Wasatch Mountains. Most of the area is a plain sloping gently down to the Great Salt Lake. There is a change in slope at elevation 4,460 feet (1,359 meters) where the plain steepens upward toward the mountains to the east.

Most of the streams issuing from the mountains in this area are dissecting or downcutting; examples are Mill Creek, Stone Creek, and Barnard Creek. Only several creeks, including Centerville Creek and Parrish Creek, have built alluvial fans.

Lake Bonneville sediments (and soils developed on them) cover most of the area. These sediments are mapped as four units: (1) Provo Formation and younger lake bottom sediments (Qlb), (2) offshore facies of the Alpine Formation (Qac), (3) shore facies of the Alpine and Bonneville formations (Qba) and (4) shore facies of the Provo Formation (Qpsf). Clay, silt, and fine sand are the main constituents of units one and two. Sand and gravel are the main constituents of units three and four. Many sand and gravel pits have been operating in unit four (**8**)*.

In sections 13, 14, 23, 24, 25, and 26, T. 3 N., R. 1 W. just west of Farmington, is one of the United States' largest landslides of the type known as failure by lateral spreading (**21, p. 83**)*. Several other much smaller landslides have been mapped along the mountain front. These slides are potentially hazardous, especially if the toe is cut out.

Wasatch Mountains

These mountains, shown along the east edge of the map, are the westernmost range in the Middle Rocky Mountains physiographic province. The highest point along the central Wasatch Front is Lone Peak with an elevation of 11,253 feet (3,430 meters), in the southeast corner of the map. Other peaks approach this height and the range thus presents a relief of about 7,000 feet (2,134 meters) above the Great Salt Lake, which has an elevation of 4,200 feet (1,280 meters).

The rocks of these mountains range in age from Precambrian to Tertiary. The oldest formation is the Farmington Canyon Complex which forms a metamorphic terrane from east of Woods Cross to Clearfield. The youngest formation is the Early Oligocene Norwood Tuff that mostly crops out in City Creek Canyon. The rocks of the range mostly consist of gneiss, limestone, quartzite, sandstone, and quartz monzonite.

The range has undergone at least two episodes of mountain building. The first resulted in uplift, folding of strata and thrust faulting. The second produced differential uplift and mainly normal faulting. The range is now a highly eroded eastward-tilted fault block (horst). The east-west anticlinal uplift of the Uinta Arch in Late Cretaceous and early Tertiary time created a synclinorium between Little Cottonwood and City Creek canyons. In mid-Tertiary time, igneous rocks, including the Little Cottonwood, Alta, and Bingham stocks were emplaced along the axis of the arch. The axis crosses the Wasatch Front just north of Little Cottonwood Canyon.

The Wasatch fault zone marks the western base of the Wasatch Mountains. The zone consists of many branching, braided, and *en echelon* faults. There are fresh fault scarps that displace Quaternary deposits near the mouths of several canyons southeast of Salt Lake City as well as in the Fruit Heights area (southeast of East Layton) of Davis County. These fresh scarps give ample evidence that the Wasatch fault zone is seismically active at present.

The Salt Lake salient, a spur of the Wasatch Mountains, projects westward about five miles from the front of the range just north of Salt Lake City. It has been downdropped along a branch fault of the Wasatch fault zone (**5**)*. This fault, convex to the east, extends southward from the area of Mueller Park to the University of Utah and then connects with the East Bench fault.

During Pleistocene time the mountains were extensively glaciated. The magnificent cirques at Alta attest to this as well as the U-shaped cross section of Little Cottonwood Canyon. The upper parts of many canyons were occupied by glaciers, and in at least two of them, Bells and Little Cottonwood canyons; the glaciers reached the mountain front.

Jordan Valley

The valley topography has been shaped by Lake Bonneville and by stream activity. Currents in Lake Bonneville and contemporaneous stream flows from the mountains combined to form spits, beaches, bars, and huge deltas such as those at and in between Big and Little Cottonwood canyons and surrounding the mouth of Weber Canyon (**10**)*. Pre-Lake Bonneville alluvial fans underlie some of these deposits and project above them on the mountain flanks. Lake bottom sediments form a nearly flat plain in the central part of the valley.

The Jordan River flows northward in the center of the valley from Utah Lake to the Great Salt Lake. The river has deposited mostly floodplain (overbank) deposits. From about 33rd South Street and northwards to the Great Salt Lake the river has formed a huge fan shaped floodplain and delta complex. Tributaries to the Jordan River, notably City Creek, Parley's Creek, and Big and Little Cottonwood creeks, have also laid down extensive floodplain and/or alluvial deposits.

The Lake Bonneville deposits have been divided and mapped as three units (**12**)*. In ascending order of age they are: The Alpine Formation whose deposits occur to an altitude of 5,050 feet (1,539 meters), the Bonneville Formation whose deposits reach an altitude of 5,200 feet (1,585 meters), and the Provo Formation whose deposits are at 4,800 feet (1,463 meters) and below. Distinct terraces can be seen at these elevations on the mountain sides around the valley. The shore facies of the Alpine and Bonneville formations were combined and mapped as one unit (Qba). The shore facies of the Provo Formation were mapped as one unit (Qpsf). Many sand and gravel pits have been opened in this unit. The lake bottom sediments (Qlb) of the Provo Formation were also mapped as a unit. *The constituents of these units were given in the Woods Cross to Clearfield section.*

[1] Geologist, Utah Geological and Mineral Survey.
*Refers to Index of Map Sources numbers.

EXPLANATION

Oquirrh Mountains

ROGERS CANYON SEQUENCE
NORTHERN OQUIRRH MOUNTAINS

Lower Permian — PERMIAN

Ppg — Grandeur Member, Park City Formation
Upper part is grayish tan dolomite, reddish gray sandstone, and tan to light gray quartzite; middle part is quartzite, sandstone, dolomite, and shale; lower part is tan to gray limestone; 760 ft. thick.

UNCONFORMITY

Oquirrh Group

Upper Pennsylvanian and Lower Permian — PENNSYLVANIAN AND PERMIAN

PIPok — Kessler Canyon Formation
The upper two-thirds is mainly tan to gray dolomitic sandstone, dolomite and chert; lower one-third is light gray, tan, and reddish brown massive quartzite and cherty limestone; about 4,260 ft. thick.

Middle Pennsylvanian — PENNSYLVANIAN

IPoe — Erda Formation
Gray limestone, tan quartzite, light brown shale, and tan sandstone; 3,620 ft. thick.

Upper Mississippian and Lower Pennsylvanian — MISSISSIPPIAN AND PENNSYLVANIAN

IPMol — Lake Point Limestone
Light gray to tan limestone; locally cherty; some beds massive; basal part of unit is mostly shale and shaly limestone; 1,740 ft. thick.

Upper Mississippian — MISSISSIPPIAN

Mgr — Green Ravine Formation
Upper part is gray limestone and black cherty limestone; lower part is gray and olive gray limestone and gray to black shale; 1,417 ft. thick.

BINGHAM SEQUENCE
CENTRAL OQUIRRH MOUNTAINS

Lower Permian — PERMIAN

Pk-dc — Kirkman and Diamond Creek Formations
The Diamond Creek Formation is mainly light gray, tan, or white sandstone; the underlying Kirkman Formation is light to bluish gray brecciated limestone. The two units are not clearly separable in some areas; 2,000 ft. exposed.

Pfp — Freeman Peak Formation
Light gray and tan calcareous quartzite with thin shale and sandstone; 2,400 ft. thick.

Pcp — Curry Peak Formation
Light gray to light tan sandstone, siltstone, and quartzite with thin interbedded limestone; 2,450 ft. thick.

Oquirrh Group

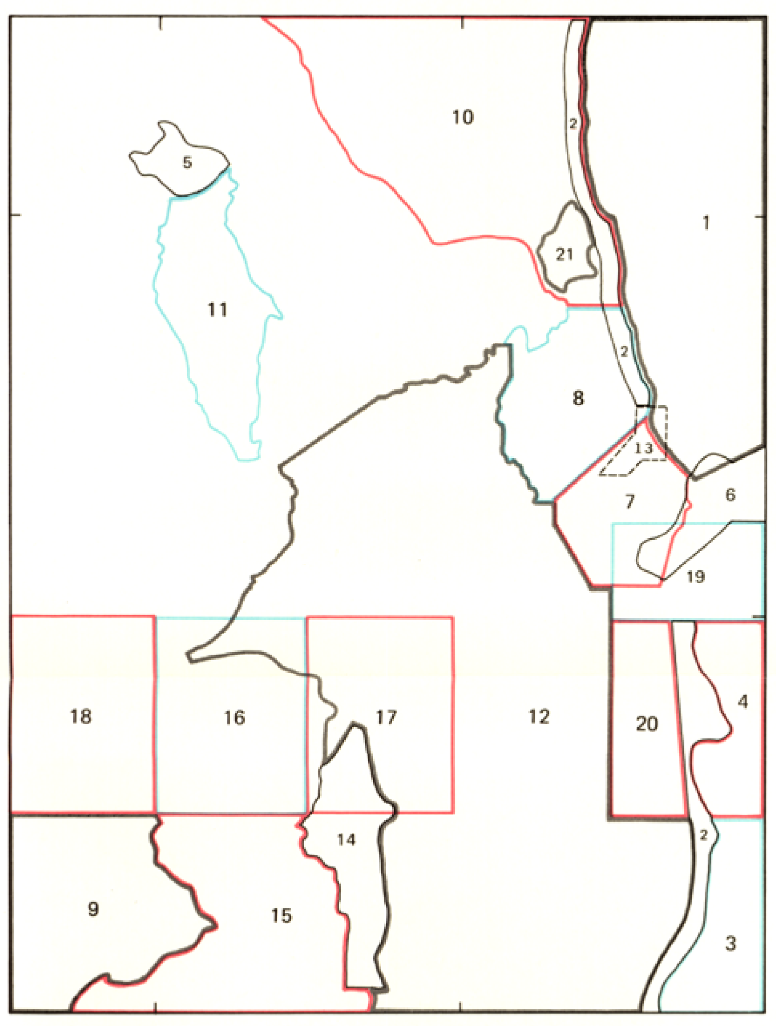
Upper Pennsylvanian — PENNSYLVANIAN

IPobm — Bingham Mine Formation
Upper part is light gray to tan quartzite with interbedded gray sandstone, limestone and siltstone; lower part is dark gray limestone, light gray to tan quartzite with interbedded gray sandstone, siltstone, and minor shale; approximately 5,270 ft. thick.

Middle Pennsylvanian

IPobp — Butterfield Peaks Formation
Upper part is light gray to tan quartzite with interbedded gray cherty limestone and calcareous sandstone; middle part is bluish gray limestone and light gray to tan quartzite; lower part is thin- to medium-bedded layers of limestone, shale, quartzite, sandstone, and siltstone; 9,072 ft. thick.

Index of Map Sources



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Wasatch Range, Adjacent Valleys and Antelope Island

QUATERNARY

Recent

Qa — Alluvial Deposits
Stream alluvium, alluvial fans, and locally, mudflows.

Qsf — Salt Flat
These soils are poorly drained and have a high silt, clay and salt content.

Qfp — Floodplains
Floodplains along existing streams.

Qfpd — Floodplain and Delta Complex
Chiefly fine-grained and poorly drained sediments.

Qaf — Abandoned Floodplain and Stream Channel Deposits
Chiefly mixtures of silt, sand, and gravel.

Pleistocene and Recent

Qt — Talus
Rock piles on steep slopes or at the base of slopes or cliffs.

Qls — Landslides
Masses of rock and soil moved downslope by the force of gravity; generally unstable slopes.

Pleistocene

Qlb — Provo Formation and Younger Lake Bottom Sediments
Clays, silts, sands, and locally, offshore sand bars.

Qpsf — Provo Formation and Younger Shore Facies
Chiefly sand and gravel in beach deposits, bars, spits, and deltas.

Qb-a — Bonneville and Alpine Formations**
Chiefly shore facies of sand and gravel; includes beach deposits, bars spits, and deltas.

Qac — Alpine Formation
Mainly offshore facies of clay, silt, and fine sand in thin beds.

Qm — Moraines
Glacial moraines, till, and outwash that consist of unsorted mixtures of clay, silt, sand, gravel, and boulders.

Qh — Harkers Alluvium
Unconsolidated and poorly sorted boulders, gravel, sand, silt, and clay deposited in pre-Lake Bonneville alluvial fans.

UNCONFORMITY

TERTIARY

Lower Oligocene

Tn — Norwood Tuff
Alluvial and lacustrine sediments that consist of white and light gray tuff, white marlstone, pink and gray volcanic conglomerate, and light gray to white tuffaceous limestone; minor siltstone; attains a thickness of 300 ft. in the Salt Lake salient.

UNCONFORMITY

Lower Eocene

Tw — Wasatch Formation
Red and reddish brown conglomerate beds with lenses of siltstone and fine to coarse sandstone; about 4,000 ft. thick in the Salt Lake salient.

UNCONFORMITY

Upper Paleocene

Tf — Flagstaff Formation
Upper part; white to light gray tuffaceous limestone with some thin beds of pebble conglomerate. Lower part; red calcareous sandstone with thin conglomerate lenses; about 1,000 ft. thick in the Salt Lake salient for both parts.

CRETACEOUS

Upper Cretaceous

Kec — Echo Canyon Conglomerate
Gray conglomerate with minor lenses of siltstone and fine to coarse sandstone; ranges from 500 to 750 ft. thick in the Salt Lake salient.

UNCONFORMITY

Lower Cretaceous

Kk, **Kkp** — Kelvin Formation
Kk, reddish brown siltstone and sandstone, gray conglomerate and gray limestone. Kkp, Parleys Member: white to light gray limestone, gray sandstone and gray conglomerate locally; 1,600 ft. thick for both members in Emigration Canyon.

JURASSIC

Upper Jurassic

Jp — Preuss Sandstone
Reddish brown to pale red sandstone and shale; 1,000 ft. thick.

Middle and Upper Jurassic

Jtc — Twin Creek Limestone
Gray to brownish gray limestone and limy shale; 2,800 ft. thick.

Upper Triassic and Lower Jurassic

JTRn — Nugget Sandstone
Tan and pale orange crossbedded sandstone; 800 ft. thick.

TRIASSIC

Upper Triassic / *Lower Triassic*

TRau, **TRag**, **TRam** — Ankareh Formation
TRau, upper member; brown to reddish purple shale, mudstone, and sandstone.
TRag, Gartra Grit Member; light gray to pale purple quartzite, locally pebbly.
TRam, Mahogany Member: brown to reddish purple mudstone, shale and sandstone; about 1,575 ft. in thickness (all three members).

TRt — Thaynes Formation
Gray fossiliferous limestone interbedded with sandstone and shale; about 1,000 ft. thick.

TRw — Woodside Shale
Red to dark brown shale; locally sandy; about 1,000 ft. thick.

PERMIAN

Lower and Upper Permian

Ppc — Park City Formation
Upper part is gray cherty limestone; middle part is dark limestone and phosphatic shale; lower part is dark gray limestone; about 850 ft. thick near the mouth of Mill Creek Canyon.

PENNSYLVANIAN

Upper Pennsylvanian

IPw — Weber Quartzite
Tan and light gray quartzite with thin gray conglomerate and quartzitic sandstone; 1,500 ft. thick.

Lower Pennsylvanian

IPrv — Round Valley Limestone
Light gray limestone, tan sandstone and dark gray limestone; many upper beds have a red to pink color; 400 ft. thick.

MISSISSIPPIAN

Upper Mississippian

Mdo — Doughnut Formation
Dark gray limestone grading downwards into black shale and rusty weathering sandstone; 300 ft. thick.

Mh — Humbug Formation
Dark to light gray limestone with interbedded tan weathering sandstone; 725 ft. thick in City Creek Canyon.

Md — Deseret Limestone
Dark to light gray limestone and dolomite with lenses of chert; 500 ft. thick in City Creek Canyon.

Lower Mississippian

Mg — Gardison Limestone
Blue gray to dark gray limestone and dolomite; 450 ft. thick southeast of Salt Lake City.

Mf — Fitchville Formation
Upper part; dark gray massive dolomite. Lower part; light gray massive dolomite; 120-150 ft. thick.

Mu — Mississippian Undivided
Mississippian formations undivided on the Salt Lake salient; approximately 2,600 ft. thick in the Salt Lake salient.

DEVONIAN

Upper Devonian

Dpp — Pinyon Peak Limestone
Light gray weathering fossiliferous limestone; 218 ft. thick in the Salt Lake salient.

Ds — Stansbury Formation
White and yellow calcareous quartzite and sandstone that grade upward into maroon limy shale with interbedded white and yellow quartzite; about 300 ft. thick in the Salt Lake salient.

UNCONFORMITY

CAMBRIAN

Middle Cambrian

Єm — Maxfield Limestone
Upper part is light gray to dark gray dolomite; middle part is light gray mottled limestone and dark gray shale; lower part is dark gray massive dolomite and limestone; 1,000 ft. thick.

Єo — Ophir Formation
Upper part is brown weathering shaly sandstone; middle part is light gray limestone with wavy laminae; lower part is olive green micaceous shale; 400 ft. thick.

Lower and Middle Cambrian

Єt — Tintic Quartzite
White, tan, and rusty weathering coarse-grained quartzite with local thin conglomerate beds; approximately 800 ft. thick on the north face of Mt. Olympus.

UNCONFORMITY

PRECAMBRIAN

Upper Precambrian

pЄm — Mutual Formation
Reddish purple quartzite and shale locally grading into grit and boulder conglomerate; a wedge-shaped unit up to 1,200 ft. thick.

UNCONFORMITY

pЄmf — Mineral Fork Tillite
Black tillite consisting of boulders and pebbles of quartzite, limestone, or granitic rocks in a black sandy matrix; up to 2,800 ft. thick.

UNCONFORMITY

pЄbc — Big Cottonwood Formation
White, green, and gray, rusty weathering quartzite interbedded with shales and silt stones that are grayish red and olive green in the upper part of the formation, brown or greenish gray in the middle part and blue to gray in the lower part; approximately 16,000 ft. thick in Big Cottonwood Canyon.

UNCONFORMITY

pЄlw — Little Willow Formation
Gray to white quartz schist interbedded with brown weathering biotite schist and dark green chlorite and amphibolite schist; at least 1,100 ft. exposed just north of the mouth of Little Cottonwood Canyon.

UNCONFORMITY

Middle Precambrian

pЄf — Farmington Canyon Complex
Gray gneiss, granulite, green schist, gray to white quartz schist, dark green to black amphibolite, gray and pink pegmatites and small granite stocks; exceeding 10,000 ft in thickness.

Tertiary Igneous Rocks

Upper Eocene and Oligocene

Tr — Shaggy Peak Rhyolite
An intrusion of light gray and purplish gray rhyolite.

Tv — Volcanic Rocks
Volcanic flows, tuffs, and breccias of andesite, latite, and quartz latite.

Tilp — Intrusive Latite Porphyry
Gray to greenish gray hornblende latite and hornblende biotite latite sills and dikes.

Tqm — Quartz Monzonite
Bingham and Little Cottonwood stocks, chiefly medium gray quartz monzonite, but also light to medium gray quartz monzonite porphyry and monzonite.

Contact
Dashed where approximately located; dotted where concealed.

Fault
Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side.

Thrust Fault
Dashed where approximately located; dotted where concealed; sawteeth on upper plate.

24
Strike and dip of beds.

** **Alpine Formation:** Early mappers subdivided Lake Bonneville sediments into divisions which corresponded to deposits associated with the various shorelines. One of these was the "Alpine Formation" which is not accepted by more recent workers and which they include with the uppermost shoreline. Since this map is a compilation of previous works the "Alpine Formation" has been maintained in the map and represents transgressive shoreline deposits.

Oquirrh Mountains

The Oquirrh Mountains are a typical north-trending range in the eastern part of the Basin and Range physiographic province. The range is about 20 miles (32 kilometers) west and southwest of Salt Lake City. The range has a single serrated ridge along which Nelson Peak, at an elevation of 9,359 feet (2,853 meters), is the highest point. The greatest relief, therefore, is on the order of 5,100 feet (1,554 meters) above that of the Great Salt Lake.

The Oquirrh Mountains probably have been thrust eastwards (or underthrust from the east) along a deep-seated plane that is now offset by normal faults. The thrust plane probably exists, at depth, under Jordan Valley as well.

The rocks and the structure of the northern Oquirrh Mountains are much different from those in the central part in which the Bingham mine is located. The major North Oquirrh thrust crosses the range about a mile south of Nelson Peak and essentially breaks the range into two blocks. The thrust is believed to have moved in a southeasterly direction; the distance is unknown.

The northern thrust block, which overrode the central block, contains the much thinner (as compared to the central block) upper Paleozoic Rogers Canyon sequence (**15, pl. 1 and p. 22**)*. This block has the following formations, in ascending order: Green Ravine Formation, Lake Point Limestone, Erda Formation, Kessler Canyon Formation, and the Grandeur Member of the Park City Formation. These units consist mostly of limestone and quartzite. Structurally, the northern block has several northeast trending anticlines and synclines that have been offset by northwest trending normal faults. The northern block has also been broken into two parts by the north trending Garfield tear fault. The east block has moved downwards and horizontally to the southeast.

The central block contains a much thicker upper Paleozoic section, the Bingham sequence. In ascending order, the units are: Butterfield Peaks Formation, Bingham Mine Formation, Curry Peak Formation, Freeman Peak Formation, and Kirkman and Diamond Creek formations undivided (**15, pl. 1 and p. 27**)*. The chief lithologies of these formations are sandstone, quartzite and limestone. These rocks are folded into several northwest-striking anticlines and synclines. They have also been intruded by granite, granite porphyry, and monzonite stocks and dikes. The largest of the stocks has been exposed in the Bingham open-pit where metal ores occur in concentric zones. In the eastern Oquirrh foothills there are outcrops of volcanic rocks that consist of latite flows, andesite flows, and latite breccias (**15**)*.

Tooele Valley

This valley is bounded on the east side by the Oquirrh Mountains, on the north by the Great Salt Lake and on the west by the Stansbury Mountains. Most of the area is a gently sloping plain that dips northwesterly toward the Great Salt Lake. To the southeast the plain begins steepening upward toward the mountains at an elevation of about 5,040 feet (1,536 meters).

Lake Bonneville sediments (and soils developed on them) cover most of the valley. These sediments were mapped as three units (**9**)*: (1) Provo Formation and younger lake bottom sediments (Qlb), (2) shore facies of the Provo Formation (Qpsf), and (3) shore facies of the Bonneville and Alpine Formations (Qba). Several sand and gravel pits have been operated in units two and three near the city of Tooele and just south of Mills Junction. The highest shoreline of Lake Bonneville is at an elevation of 5,240 feet (1,627 meters).

The Harkers Alluvium is exposed in several places around the eastern and southeastern parts of the valley. This unit is comprised of unconsolidated pre-Lake Bonneville alluvial fan material that extends above the highest lake level.

Near the mouth of Bates Canyon and to the south (secs. 23 and 26, T. 2 S., R. 4 W.) two almost parallel faults were traced along the western base of the Oquirrh Range. Farther south (in sec. 35) the easternmost fault was traced through two springs alongside the Union Pacific railroad. A northeasterly trending normal fault was mapped across the Harkers Alluvium near the mouths of Spring Canyon and Middle Canyon. It cuts across Middle Canyon at Angels Grove, a spring area.

GENERAL REFERENCES

The interested reader is referred to the following publications that deal with the general geology, the Wasatch fault zone, hydrology, and environmental problems along the Wasatch Front:

Crittenden, Max D., 1964, General geology of Salt Lake County: Utah Geological and Mineral Survey Bulletin 69, 192 p. (Also papers on Lake Bonneville, mining, and water supplies.)

Gwynn, J. Wallace (ed.), 1980, Great Salt Lake: Utah Geological and Mineral Survey Bulletin 116, 400 p. (Papers on geology, chemistry, hydrology, biology, and engineering.)

Hilpert, Lowell S. (ed.), 1972, Environmental Geology of the Wasatch Front, 1971: Utah Geological Association Publication 1. (Papers on geology, faults, seismicity, landslides, floods, sand and gravel, and water supplies.)

Jensen, Mead Leroy (ed.), 1969, Guidebook of Northern Utah: Utah Geological and Mineral Survey Bulletin 82, 266 p. (Papers on prehistoric man, geology, geochemistry, Wasatch fault zone, hydrology, floods, and ore deposits.)

Marsell, Ray E. (ed.), 1952, Geology of the Central Wasatch Mountains: Utah Geological Society Guidebook No. 8, 71 p.

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